CANADIAN PETROLEUM ASSOCIATION
PIPELINE DIVISION

OIL PIPELINE PERFORMANCE REVIEW

1986

CANADIAN PETROLEUM ASSOCIATION

PIPELINE DIVISION

OIL PIPELINE PERFORMANCE REVIEW

1986

- TECHNICAL COMMITTEE -

OIL PIPELINE PERFORMANCE REVIEW SUBCOMMITTEE

W.W. Scott	-	Chairman
F.E. Webb	-	Member
M.M. Frith	-	Member
R.J. Frocklage	-	CPA Liaison
S.P. Rodrigues	-	CPA Statistician

CANADIAN PETROLEUM ASSOCIATION
1986 OIL PIPELINE PERFORMANCE REVIEW
TABLE OF CONTENTS

		PAGE
	EXECUTIVE SUMMARY	
1.0	INTRODUCTION	1
2.0	PERFORMANCE REVIEW	4
	2.1 1986 Highlights	4
	2.2 Historical Review	5
3.0	FAILURE REVIEW	7
	3.1 Highlights	7
	3.2 Historical Summary	7
APPENDICES		
	A Failure Details	11
	B CPA Report Forms - General Data Report	17
	- Failure Report	18
	C 1986 OPPR Participants	19

LIST OF EXHIBITS

	PAGE
EXHIBIT 1 - Summary of 1986 Failures	Executive Summary
EXHIBIT 2 - Historical Summary of Failures	Executive Summary
EXHIBIT 3 - Scope	3
EXHIBIT 4 - Statistical Summary	6
EXHIBIT 5 - List of Failures by Category	8
EXHIBIT 6 - 1986 Failure Statistics	9
EXHIBIT 7 - Summary of Failures 1986 vs 1985	10

1986 OIL PIPELINE PERFORMANCE REVIEW
EXECUTIVE SUMMARY

A. GENERAL OVERVIEW

- Failures per thousand kilometres of pipeline in service were down from 1.4 to 1.2 in 1986.
- Four pipeline systems were added to the list of those reporting.
- Repair/cleanup costs were 31% of the 1985 costs and 58% of the previous 9 year average.

B. 1986 HIGHLIGHTS

(i) Performance

- In-service length of the systems reporting increased from 30 905 km in 1985 to 32 617 km in 1986.
- Deliveries increased 4% to 219 x $10^6 m^3$ in 1986 compared to 1985.
- Traffic volume decreased 2% to 133 x $10^9 m^3.km$ when compared to 1985.

(ii) Failures

- Thirty-nine (39) failures were reported.
- The average spill size in 1986 was 21% of the 1985 average.
- There were no line pipe failures due to defective pipe in 1986.
- Spilled volume decreased by 81% to 2 055 m^3.
- Failures resulted in four injuries, two fires and one explosion with fire.
- Exhibit 1 shows a category distribution for 1986 and Exhibit 2 is a graphical summary of failures by category for the past 15 years.

CANADIAN PETROLEUM ASSOCIATION
1986 OIL PIPELINE PERFORMANCE REVIEW
SUMMARY OF FAILURES

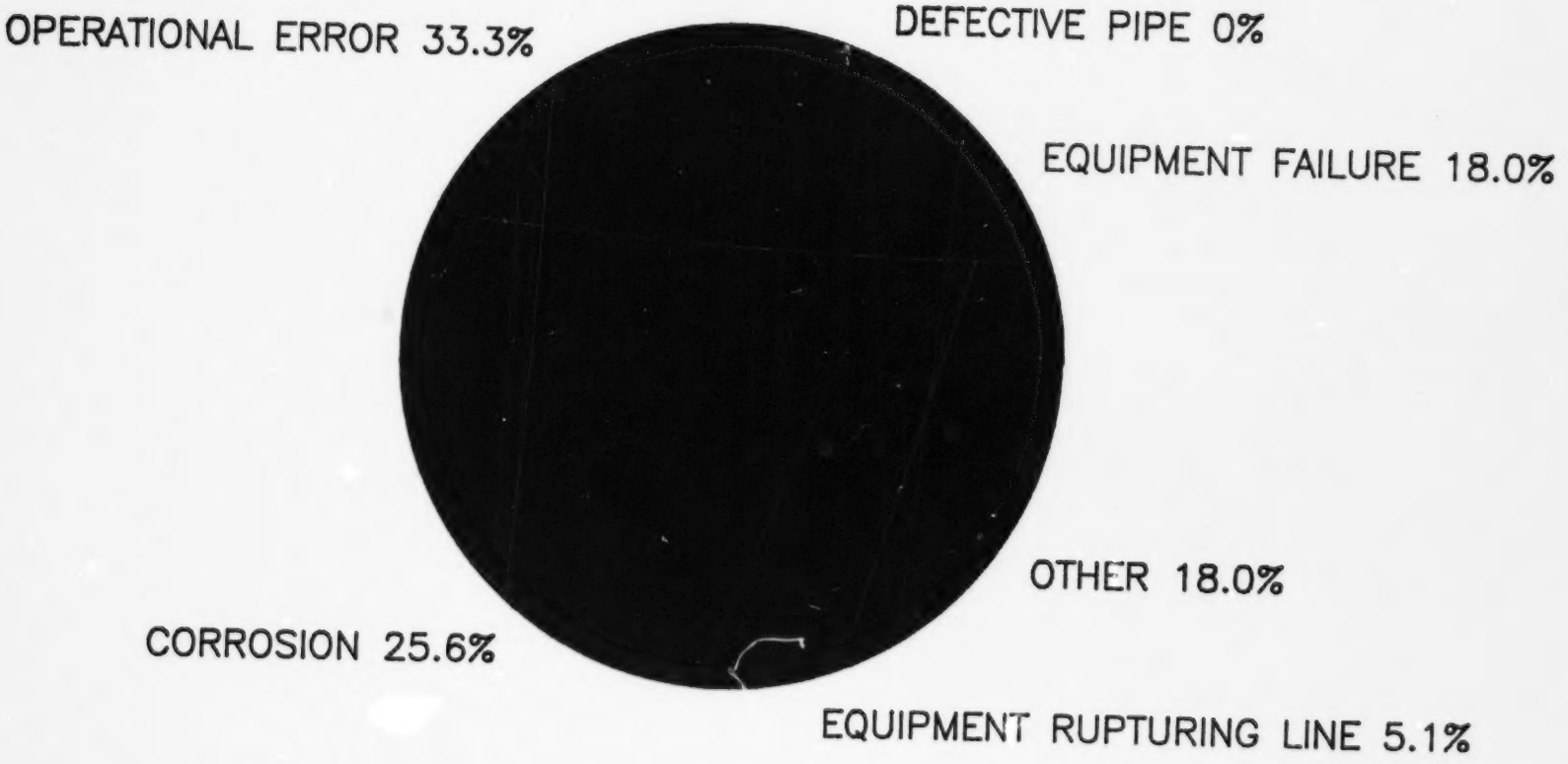
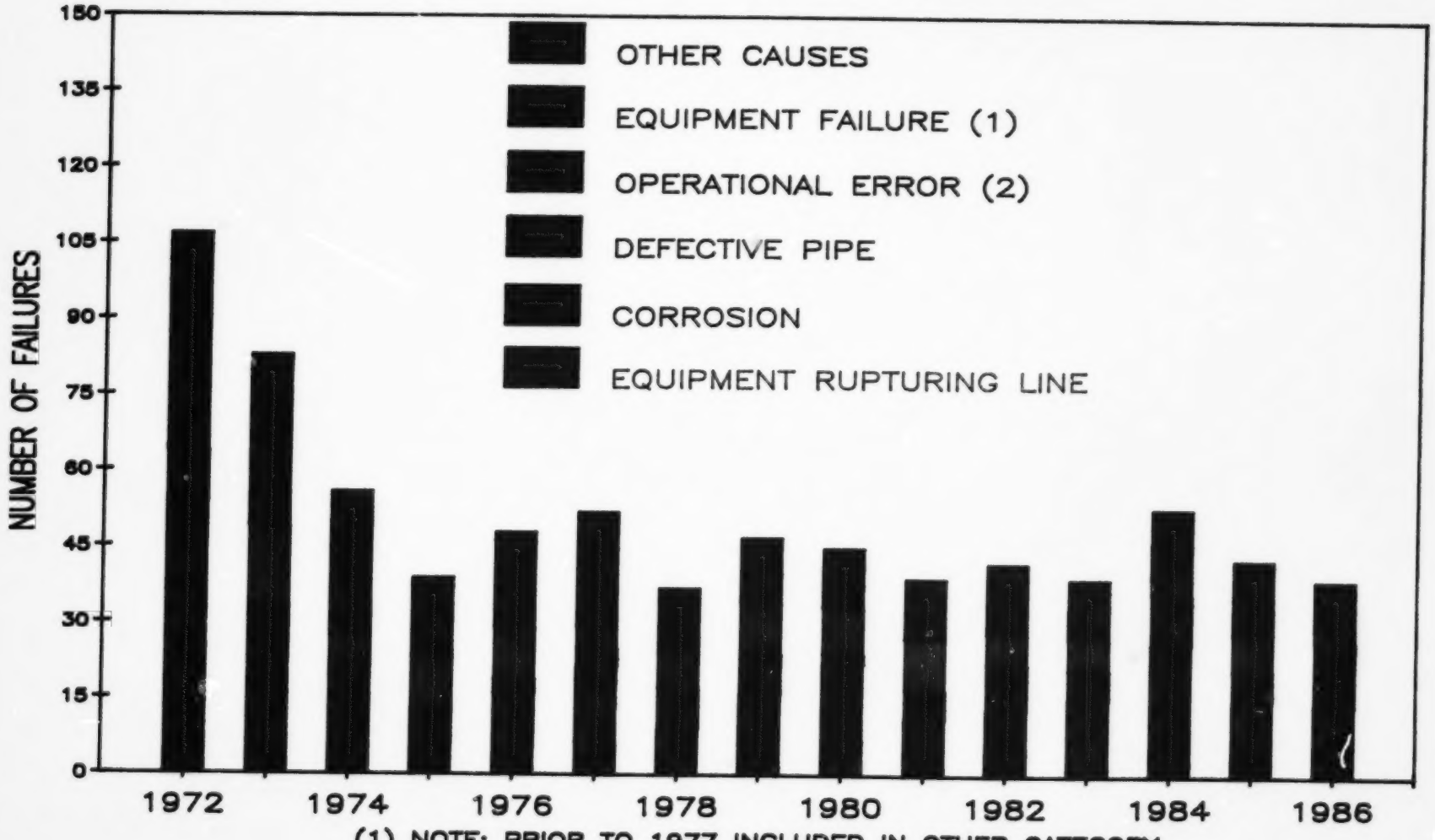


EXHIBIT 1.

CANADIAN PETROLEUM ASSOCIATION
1986 OIL PIPELINE PERFORMANCE REVIEW
HISTORICAL SUMMARY OF FAILURES



(1) NOTE: PRIOR TO 1977 INCLUDED IN OTHER CATEGORY
(2) NOTE: PRIOR TO 1976 INCLUDED IN OTHER CATEGORY

EXHIBIT 2.

CANADIAN PETROLEUM ASSOCIATION

1986 OIL PIPELINE PERFORMANCE REVIEW

1.0 INTRODUCTION

All liquid hydrocarbon pipelines in Canada, including crude oil, refined products and High Vapour Pressure (HVP) lines are requested to participate in this industry analysis by submitting voluntary, confidential performance and failure reports. The majority of these pipeline systems are represented by the Canadian Petroleum Association (CPA).

Pipelines included in this review fall within the scope of Canadian Standards Association Standard Z183-M86, Oil Pipeline Transportation Systems. However only oil lines downstream of production facilities and refined petroleum product lines are covered. Multi phase lines, producer operated pipelines and flow lines now included in Z183-M86 are not covered. This scope is shown diagrammatically in Exhibit 3.

All data for the review was collected by CPA on two standard forms. Samples of the Oil Pipeline General Data

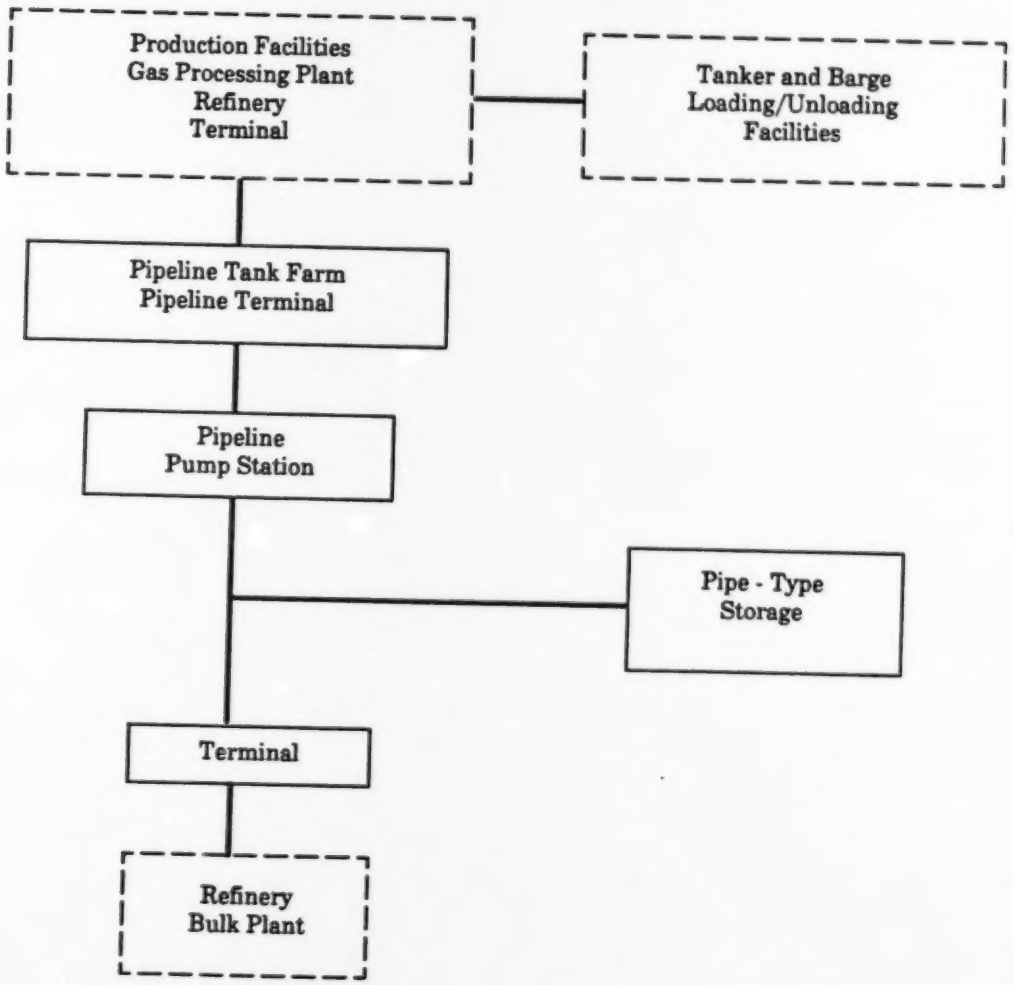
Report and the Oil Pipeline Failure Report are included in Appendix B. Incidents resulting in a spill of 1.5 m^3 or more of oil, or any amount of HVP material, and any incident involving an injury, a death, a fire, or an explosion are classified as reportable.

Care must be exercised in any attempt to apply or compare statistics included in this review to any particular pipeline system or regulatory jurisdiction. They have been generated on the basis of submissions from a wide variety of pipelines, including gathering systems.

EXHIBIT 3

CANADIAN PETROLEUM ASSOCIATION

1986 OIL PIPELINE PERFORMANCE REVIEW SCOPE



Note: Only facilities and pipelines indicated by solid lines are within scope of CPA Oil Pipeline Performance Review

2.0 PERFORMANCE REVIEW

2.1 1986 VS 1985 HIGHLIGHTS

Seventy participating Canadian oil pipeline systems submitted reports. They represent in excess of 90% of the industry and include all major pipeline systems. The statistics in this review are therefore considered representative of the industry.

A comparison of key results:

	1986	1985	% Change
Pipeline Systems Reporting	70	66	+6.1
Length of Line In-Service - km	32 617	30 905	+5.5
Delivery Volume x 10^6 m^3	219.0	211.6	+3.5
Traffic Volume x 10^9 m^3.km	132.6	135.0	-1.7
No. of Failures	39	43	-9.3
Volume spilled - m^3	2055	10 738	-80.9
Repair/Clean-up Costs - k$	794	2 533	-69.0

- Four injuries, two fires and one explosion with fire were reported.
- No defective pipe failures were reported in 1986.
- The average spill size in 1986 was 21% of the 1985 average. There were no major spills due to line pipe failure.
- One leak was detected by a leak detection system. In the majority of the other cases the leaks were detected by pipeline employees.

2.2 HISTORICAL REVIEW

A ten year statistical summary of oil pipeline performance data is presented in Exhibit 4.

Key observations and highlights are:

- Four pipeline systems were added to the list of those reporting.
- Failures per unit volume was down from previous years' statistics. Spilled volume was down from the previous year.
- Length of line in-service was the largest in the ten years considered.
- Repair and cleanup costs were down significantly from previous years.

CANADIAN PETROLEUM ASSOCIATION
1986 OIL PIPELINE PERFORMANCE REVIEW
STATISTICAL SUMMARY

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Number of Pipeline Systems Reporting	45	51	51	53	53	61	61	65	66	70
Length of Line in Service - km	26 591	30 569	29 678	29 785	29 650	30 308	30 439	30 615	30 905	32 617
Delivery Volume x 10^6 m^3	n/a	212.3	245.4	235.7	214.9	211.6	204.4	215.3	211.6	219.0
Traffic Volume x 10^9 m^3.km***	137.4	129.2	144.8	138.5	122.6	123.1	128.7	134.1	135.0	132.6
Number of Failures	40	37	47	45	39	42	39	53	43	39
Failures per 10^3 km	1.5	1.2	1.6	1.5	1.3	1.4	1.3	1.7	1.4	1.20
Failures per 10^9 m^3.km	0.29	0.29	0.32	0.33	0.33	0.34	0.30	0.39	0.32	0.29
Volume Spilled - m^3	6 335	4 881	7 014	8 511	2 377	6 537	7 450	6 171	10 738	2 055
Volume Lost - m^3*	3 786	742	2 614	5 931	1 427	3 531	6 038	2 982	7 830	654
Average Spill Size - m^3	158	132	149	189	61	156	196	116	250	53
Largest Spill Size - m^3	1 210	2 970	1 987	6 061	516	1 365	1 589	1 994	3 800	320
Injuries Resulting From Failures	0	0	1	0	0	2	4	2	5	4
Deaths Resulting From Failures	0	0	0	0	0	0	1	0	2	0
Repair, Damage and Spill Clean-up Costs - k$ **	834	431	1 611	1 254	634	1 320	2 721	953	2 533	794.0

* Definition of Volume Lost: 1977 - Volume Unrecovered + Volume Disposed.
1978-1986 - Volume Unrecovered.

** Does not include cost of oil lost due to failure.

*** Not all volumes move total system length.

EXHIBIT 4

3.0 FAILURE SUMMARY

3.1 HIGHLIGHTS

Seventeen of the seventy participating pipeline systems reported a total of thirty-nine (39) failures in 1986. Failures were distributed as follows:

Ten Systems	- 1 Failure
One System	- 2 Failures
One System	- 3 Failures
Two Systems	- 4 Failures
Two Systems	- 5 Failures
One System	- 6 Failures

Exhibit 5 provides a summary of 1986 failure categories.

Exhibit 6 provides additional details for each failure category. There were two fires and an explosion with fire and four injuries associated with maintenance/construction activities.

Sixty-four percent of the failures were detected by pipeline employees, twenty percent by outside parties and the balance by surveilance and leak detection systems.

3.2 1986 vs 1985 Failure Categories

Refer to Exhibit 7 for a comparison of failure category distribution for 1986 and 1985. Some observations:

- No failures were caused by defective pipe in 1986.
- Corrosion failures increased to 10 in 1986 from 5 in 1985.
- Failures due to other causes increased to 7 in 1986 from 4 in 1985.
- Equipment failures decreased to 7 in 1986 from 11 in 1985.
- Operator errors increased to 13 in 1986 from 6 in 1985.

Refer to Appendix A for failure details.

EXHIBIT 5

CANADIAN PETROLEUM ASSOCIATION
1986 OIL PIPELINE PERFORMANCE REVIEW
LIST OF FAILURES BY CATEGORY

EQUIPMENT FAILURES		
Gasket Failure	1	
Fittings	4	
Packing	1	
Level Switch	1	
	7	7
EQUIPMENT RUPTURING LINE		
Contract Equipment	2	
	2	2
CORROSION		
External	4	
Internal	6	
	10	10
OPERATIONAL ERROR		
Valve not Closed	4	
Overfilling	5	
Repair Procedure	3	
Sequencing	1	
	13	13
OTHER		
Pipe Previously Damaged	3	
Defective Tank Weld	2	
Animal Opened Valve	1	
Truck Collision	1	
	7	7
TOTAL		39

CANADIAN PETROLEUM ASSOCIATION
1986 OIL PIPELINE PERFORMANCE REVIEW
FAILURE STATISTICS

	EQUIPMENT FAILURE	EQUIPMENT RUPTURING LINE	CORROSION EXTERNAL	CORROSION INTERNAL	OPERATIONAL ERROR	OTHER CAUSES	TOTAL
NUMBER OF FAILURES	7	2	4	6	13	7	39
FAILURE LOCATION							
- LINE PIPE	-	2	3	3	1	4	13
- PUMP STATION	3	-	1	1	5	1	11
- TANK FARM	1	-	-	2	6	2	11
- DELIVERY POINT	3	-	-	-	1	-	4
DETECTION METHOD							
- OUTSIDE PARTY	1	1	1	-	1	4	8
- PIPELINE EMPLOYEE	5	1	2	3	12	2	25
- R.O.W. SURVEILLANCE	1	-	1	3	-	-	5
- LEAK DETECTION SYSTEM	-	-	-	-	-	1	1
FAILURE IMPACT							
- INJURIES	-	4	-	-	-	-	4
- FIRES	-	1	-	-	2	-	3
- EXPLOSIONS	-	1	-	-	-	-	1
- AREA DAMAGED (HECTARES)	1.3	-	0.6	0.25	0.1	1.545	3.795
- COSTS (k$)	167	215	104	132.3	57.2	118.5	794.0
- CLEAN-UP TIME (DAYS)	49	2	23	26	17.3	20	137.3
- SHUTDOWN TIME (DAYS)	1.5	3.3	1.63	13	3.6	6.3	29.3
SPILL VOLUME (m^3)							
- RELEASED	415.2	510.3	10.5	279.6	591.85	247.7	2055.15
- LOST	10.6	510.3	1	3.6	29	99.4	653.9
- RECLAIMED	357.6	-	1	273	470.45	128.3	1230.35
- DISPOSED	47	-	8.5	3	92.4	20	170.9
COMMODITY RELEASED							
- CRUDE OIL	6	-	3	5	6	6	26
- CONDENSATE	-	-	-	1	3	1	5
- REFINED PRODUCTS	1	-	1	-	4	-	6
- HVP	-	2	-	-	-	-	2

EXHIBIT 6

EXHIBIT 7

CANADIAN PETROLEUM ASSOCIATION

1986 OIL PIPELINE PERFORMANCE REVIEW

SUMMARY OF FAILURES

	1985	1986
EQUIPMENT FAILURES	11	7
EQUIPMENT RUPTURING LINE	7	2
CORROSION	5	10
OPERATIONAL ERROR	6	13
DEFECTIVE PIPE	10	-
OTHER	4	7
TOTAL	43	39

CANADIAN PETROLEUM ASSOCIATION

1986 OIL PIPELINE PERFORMANCE REVIEW

FAILURE DETAILS

Failures have been arranged into 5 categories as indicated in Exhibits 4, 5 and 6. Details of each failure category are as follows:

1. EQUIPMENT FAILURE

This category accounted for seven (18%) of the failures in 1986, a decrease from the eleven failures in the preceding year. There were no injuries, fires, or explosions associated with these failures. Of the 415 m^3 released only 11 m^3 were lost.

The failure of various fittings accounted for four of the failures. One incident was responsible for 77% of the liquid released in this category.

The three most significant failures are highlighted as follows:

(i) In February a nipple on a pump bearing cooling line broke releasing 320 m^3 of crude oil. The oil was contained by the station berm and no oil was lost.

(ii) In March, a steel sample bottle failed releasing 21 m^3 (3 m^3 lost). The failure may have been precipitated by freezing water.

(iii) In August, a flex hose on a temporary cleanup line failed releasing 55 m^3 which were all recovered.

2. EQUIPMENT RUPTURING LINE

There were two failures in this category in 1986 compared with seven in 1985.

A contractor's backhoe struck and broke a nipple on the top of a 219mm pipe allowing liquid butane to escape. Four injuries resulted from the explosion and fire which consumed all of the 193 m^3 of butane released.

During the course of drilling a water well a contractor punctured a line allowing 317m^3 of product to escape.

3. CORROSION

a. EXTERNAL

The four cases of external corrosion resulted in relatively minor incidents accounting for less than 1% of the total volume released during 1986. The highlights are:

(i) Three separate failures occurred due to a single construction error when a rectifier was mistakenly connected to the pipeline test leads. A total of 8.5 m^3 was released (none lost).

(ii) In December an underground drain line was found to be leaking through a corrosion pit. Of the 2 m^3 of refined product released, 1 m^3 was recovered.

b. INTERNAL

Internal corrosion accounted for six failures compared to three in the previous year. A total of 280 m^3 was released which is significantly less than in 1985.

(i) Three leaks occurred in small diameter crude oil lines that were 14, 21, and 23 years old. Inhibitors were not used. A total of 30 m^3 was released (4 m^3 lost).

(ii) Two leaks occurred as a result of internal corrosion of tank outlet lines. In one case 4.8 m^3 of condensate were released (none lost) and in the other 38 m^3 of crude oil were released (trace lost).

(iii) At a pump station, a 23 year old segment of pipe which was subject to no-flow for extended periods released 207 m^3 of crude oil (none lost).

4. OPERATIONAL ERROR

There were thirteen incidents of operational error that resulted in the release of 592 m^3 (29 m^3 lost). While the frequency of error is higher than the previous year, the volume released is significantly lowered.

(i) Four incidents of valves not being closed resulted in the release of 272 m^3 (2 m^3 lost).

(ii) There were five incidents of tanks being over filled. A total of 56 m^3 was released (22 m^3 lost).

(iii) Three incidents occurred due to repair procedures. Two minor fires resulted -- one from leakage around an air bag and one from the ignition of oil residue by a spark from an electrical cord. In the third incident

an unanchored repair fitting came uncoupled while the line was being pressurized. A total of 262 m^3 of refined product was released (5 m^3 lost).

(vi) Incorrect valve sequencing resulted in the release of 2 m^3 of refined product (none lost).

5. OTHER

There were seven failures attributed to this category accounting for 248 m^3 (12%) of the total volume spilled.

(i) Three failures occurred due to previous pipe damage. A total of 151 m^3 was released (69 m^3 lost).

(ii) Defective tank welds resulted in two failures with the combined release of 52 m^3 of crude oil with only a minor loss.

(iii) One failure resulted from cattle rubbing against a ball valve. A total of 30 m^3 of crude oil was released and lost.

(iv) A release of 15 m^3 of crude oil (none lost) occurred as a result of above ground piping being hit by a tank truck.

APPENDIX B

OIL PIPELINE GENERAL DATA REPORT

OIL PIPELINE FAILURE REPORT

OIL PIPELINE GENERAL DATA REPORT

CANADIAN PETROLEUM ASSOCIATION

YEAR 19

Sheet ..... of .....

PIPELINE COMPANY OR SYSTEM

Name: .....

Address: .....

.....

INSTRUCTIONS

1. This report is for clean oil onshore pipeline systems covered by CSA Standard Z183 – Oil Pipeline Transportation Systems.
2. A separate report should be made for each operating pipeline system and forwarded to CPA within 30 days of each year end.
3. Zone Location questions apply only to systems handling High Vapour Pressure (HVP) material.
4. Reports by CPA member companies must be completed or reviewed for completeness by CPA Technical Committee or Pipeline Division member.

FAILURES

Number of Reportable Failures During Recording Calendar Year: (A failure report must be submitted for each reportable failure) .....

VOLUME DATA

Volume of Oil Transported During Year – LVP ..... m³

– HVP ..... m³

Volume – Distance during year – LVP ..... m³ km

– HVP ..... m³ km

CONSTRUCTION DATA

Pipeline Metrage at Various Depths of Cover:

Nominal Depth of Cover	Zone 1	Zone 2	Total System
Less than 75 cm	..... km	..... km	..... km
75 cm to 100 cm	..... km	..... km	..... km
101 cm to 125 cm	..... km	..... km	..... km
126 cm to 150 cm	..... km	..... km	..... km
Greater than 150 cm	..... km	..... km	..... km
Total System Metrage	..... km	..... km	..... km

PIPELINE SURVEILLANCE DATA

Pipeline Metrage Under Right-of-Way Surveillance:

Type of Surveillance	Zone	Metrage	Frequency
(a)	.....	..... km	.....
(b)	.....	..... km	.....
(c)	.....	..... km	.....
(d) No regular surveillance	.....	..... km	.....
Total System Metrage	.....	..... km	.....

Pipeline Metrage Under Leak Detection Surveillance:

Is the Pipeline system under ☐ manual ☐ automatic/computer leak detection surveillance. If Electronic or automatic provide details following:

Type of System	Zone 1	Zone 2
(a)	..... km	..... km
(b)	..... km	..... km
(c)	..... km	..... km
(d)	..... km	..... km

MAINLINE VALVE DATA

Mainline Valve or Check Valve Spacing:

Valve Spacing	Zone 1 Total Metrage	Zone 1 No. of Valves	Zone 2 Total Metrage	Zone 2 No. of Valves
Greater than 30 km	km		km	
21 km to 30 km	km		km	
11 km to 20 km	km		km	
5 km to 10 km	km		km	
Less than 5 km	km		km	
Total Metrage	km		km	

Number of Valves with Remote Operation: Zone 1 Zone 2

PIPE DATA

Include all specifications requested below for pipe sections of 1.0 km or more. For sections less than 1.0 km include specifications in totals for similar size pipe.

Zone	Outside Diameter	Wall Thickness	Length	Grade	Seam Type
	mm	mm	km		
	mm	mm	km		
	mm	mm	km		
	mm	mm	km		
	mm	mm	km		
	mm	mm	km		
	mm	mm	km		
	mm	mm	km		
	mm	mm	km		
	mm	mm	km		
	mm	mm	km		
	mm	mm	km		

Use Additional Data Reports as Required.

GENERAL SYSTEM DATA

	Length (km)	Number of Stations	Number of Pumps	Installed Power (kW)	Storage (M^3)
Mainline					
Gathering					
Total					

Total number of full time employees: .....

REPORTED BY

Name: ..... Date Completed: .....

Title: ..... Telephone No.: .....

CPA * MEMBER

Name: ..... Date Checked: .....

* If applicable.

MAIL TO: Canadian Petroleum Association – Pipeline Division;
3800, 150 - 6th Avenue S.W., Calgary, Alberta T2P 3Y7

OIL PIPELINE FAILURE REPORT

CANADIAN PETROLEUM ASSOCIATION

Sheet ..... of .....

PIPELINE COMPANY OR SYSTEM

Name: .....

Address: .....

.....

INSTRUCTIONS

1. This report is for pipeline systems coverod by CSA Standard Z183 – Oil Pipeline Transportation Systems. All data on this form will be kept confidential in accordance with request in "UCE OF DATA" section.
2. A separate report should be made out for each failure and for.varded CPA as soon as possible, but not later than 60 days after the failure.
3. A reportable failure is one in which 1.5 m^3 or more of oil are released; OR one in which any High Vapour Pressure (HVP) material is released; OR one in which there is an injury, a death, a fire, or an explosion. Failures during controlled testing, when using oil as the test medium, should be reported in accordance with these guidelines.
4. Zone location questions apply only to failures involving HVPs.
5. Reports by CPA member companies must be completed or reviewed for completeness by CPA Technical Committee or Pipeline Division Member.
6. Property damage Costs reported under Failure Impact will be reported excluding product loss.

NOTE

Please complete all appropriate sections including "WRITTEN ACCOUNT OF FAILURE" using Typewriter or Black Ink.

GENERAL INFORMATION

Date of Failure

Year	Month	Day	Time (24 h)
			:

Commodity Released

Volume Information – Cubic Metres

Released		Recovered		Lost
	=		+	

Recovered		Reclaimed		Disposed
	=		+	

Province: .....

Nearest Town: .....

Area Type: ☐ Urban ☐ Rural

Spill was on: ☐ Land ☐ Water

Terrain Type: .....

Zone Location if applicable: ☐ Zone 1 ☐ Zone 2

Installation Year of Failed Component: 1 9 ☐ ☐

☐ Line Pipe ☐ Pump Station ☐ Tank Farm ☐ Delivery Point

MAJOR CAUSE OF FAILURE

Please Check One Only:

☐ Internal Corrosion ☐ Defective Pipe ☐ Equipment Rupturing Line
☐ External Corrosion ☐ Defective Weld ☐ Pipe Previously Damaged
☐ Operational Error ☐ Equipment Failure ☐ Natural Hazard
☐ Other (Specify): .....

ORIGIN OF SPILL

Please Check One Only:

☐ Pipe ☐ Scraper Trap ☐ Valve ☐ Meter
☐ Seam Weld ☐ Welded Fitting ☐ Pump ☐ Prover
☐ Girth Weld ☐ Bolted Fitting ☐ Tank ☐ Strainer
☐ Other (Specify): .....

DETECTION OF SPILL

☐ Outside Party ☐ Pipeline Employee ☐ Leak Detection System

Leak Detection System is: ☐ Manual ☐ Transient Model ☐ Volume Balance

Was the leak detectable within the Leak Detection System ☐ Yes ☐ No

Describe .....

.....

Time from Failure to Detection of Failure ..... hrs. ..... min.

FAILURE IMPACT

Number of Injuries		Number of Deaths		Fire	Explosion	Area Damaged (hectares)	
Employees	Others	Employees	Others	☐ Yes ☐ No	☐ Yes ☐ No	Pipeline	Others

Clean-up Costs	Property Damage Costs		Clean-up Time	Duration of System Shutdown	
	Pipeline	Others			
$	$	$	Days	Days	Hours

IF FAILURE OCCURRED IN PIPE

Pipe Diameter	Pipe Wall Thickness	Specification and Grade	Type of Seam Weld	Type of Girth Weld	Metallurgical Report Done?
mm	mm				☐ Yes ☐ No

Depth of Cover if Below Ground	Configuration at Point of Failure	Type of Coating	Condition of Coating	Size of Failure (Major Dimension)
cm	☐ Straight ☐ Sag Bend ☐ Side Bend ☐ Overbend			mm

Allowable Operating Pressure	Pressure at Time and Location of Failure	Date of Last Pressure Test			Distance to Nearest Valve		Evidence of Brittle Fracture?	Flowrate at Time of Failure
		Y	M	D	Upstream	Downstream		
kPa	kPa				km	km	☐ Yes ☐ No	m^3/h

IF CORROSION

☐ Internal ☐ External	If Internal, was Inhibitor Used?	If External, was System under Cathodic Protection?	Type of Cathodic Protection	Appearance of Failed Facilty
	☐ Yes ☐ No	☐ Yes ☐ No		

IF EQUIPMENT RUPTURING LINE

Type of Equipment and Activity Causing Failure	Was Equipment Operator Aware of Pipeline? How?	Was Pipeline Aware of Equipment Activity? How?	Was One-Call System in Operation?
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Frequency and Type of ROW Surveillance at Failure Location	Did Failure Occur at Time of Damage	If Previous Damage, How Long between Damage and Failure?	Distance to Nearest Warning Sign
	☐ Yes ☐ No		m

WRITTEN ACCOUNT OF FAILURE

Include a brief written account of the failure with any special details, recommendations that may prevent similar failures, or information that may assist Standard and Code writing bodies. (Other written reports of the failure may be attached.)

USE OF DATA

Please Check One Only:

☐ Data on this form must be restricted to use by CPA only.

☐ Data on this form may be reviewed by CSA Z-183 Technical Committee.

REPORTED BY

Name: Date Completed:

Title: Telephone No.:

CPA * MEMBER

Name: Date Checked:

* If applicable.

MAIL TO: Canadian Petroleum Association – Pipeline Division;
3800, 150 - 6th Avenue S.W., Calgary, Alberta T2P 3Y7

80-01

APPENDIX C

1986 OIL PIPELINE PERFORMANCE REVIEW

PARTICIPATING PIPELINES

CANADIAN PETROLEUM ASSOCIATION
1986 OIL PIPELINE PERFORMANCE REVIEW
PARTICIPATING PIPELINE OPERATORS AND COMPANIES

Alberta Energy Co. Ltd.
- Alberta Oil Sands Pipeline
- Cold Lake Bitumen Blend & Diluent Line
- Cold Lake Condensate Line
- Redwater Pipeline

B.P. Resources Canada Limited
- Chauvin/Hardisty
- Red Earth System

Dome Petroleum Limited
- Alberta Ethane Gathering System Ltd.
- Aurora Pipe Line Company
- Cochin Pipe Lines Limited
- Dome Amoco Cochrane - Edmonton Pipeline
- Empress - Kerrobert Pipeline
- Rangeland Pipe Line Company

Esso Petroleum Canada
- Quebec South Shore Pipe Line
- Sarnia Products Pipe Line
- Winnipeg Pipeline Company Limited
- Imperial Pipeline Company Limited
    - Excelsior/Fairydell Crude System
    - Leduc Crude System
    - Acheson/Golden Spike System
    - Redwater Propane System
    - Alberta Butane System
    - Edmonton-Sundre Crude Line

Esso Resources Canada Limited
- Judy Creek Condensate PipeLine
- Quirk Creek PipeLine
- Nisku Products Pipeline Company Limited

Gibson Petroleum Company Limited

Gulf Canada Corporation
- Gulf Alberta Pipe Line
- Valley Pipe Line
- Rimbey Pipeline Co. Ltd.
- Fort Saskatchewan Pipeline

Home Oil Company Limited
- Cremona Pipe Line Division
- Federated Crude System
- Federated NGL System
- Manyberries Pipe Line

Husky Oil Operations Ltd.
- Saskatchewan System
- Wainwright System
- Kinsella System
- Battle River System
- Cold Lake Pipeline System
- Lloydminster/Hardisty Mainline System

Interprovincial Pipe Line Limited
Interprovincial Pipe Line Limited (NW) NL

Mobil Oil Canada Ltd.
- Rainbow Pipe Line Company Ltd.
- South Saskatchewan Pipe Line Company

Montreal Pipe Line Limited

Murphy Oil Company Ltd.
- Cactus Lake Pipeline
- Milk River Pipeline
- Wascana Pipeline Ltd.
- Manito Pipelines Ltd.

Norcen Energy Resources Ltd.
- Virden
- Fort St. John
- Camrose (EPL)
- Camrose (Golden)
- Weyburn

Peace Pipe Line Ltd.

Pembina Resources Limited

Petro Canada Products
- Stony Beach Pipeline
- Saskatoon Pipe Line
- Alberta Products Pipe Line Ltd.

Petro Canada Resources
- Petroleum Transmission Company

Petromont Inc. (Shawinigan P.L.) NR

Producers Pipeline Inc.
- Westspur Pipeline NR
- Producers Pipeline NR

Sun-Canadian Pipe Line Company Limited

Sun Pipe Line Company

Suncor Inc.
- Blueberry Taylor Pipeline
- Ft. McMurray to Edmonton Oil Pipeline

Texaco Canada Inc.
- Green River Exploration Company

Texaco Canada Resources Ltd.
- Rimbey to Edmonton System
- Bonnie Glen System
- Bonnie Glen to West Pembina
- A.G.E. to Bonnie Glen

Trans Mountain Pipe Line Company Ltd.

Trans-Northern Pipelines Inc.

Unocal Canada Limited

Westcoast Petroleum Ltd.

Note: NR: New Report NL: New Line